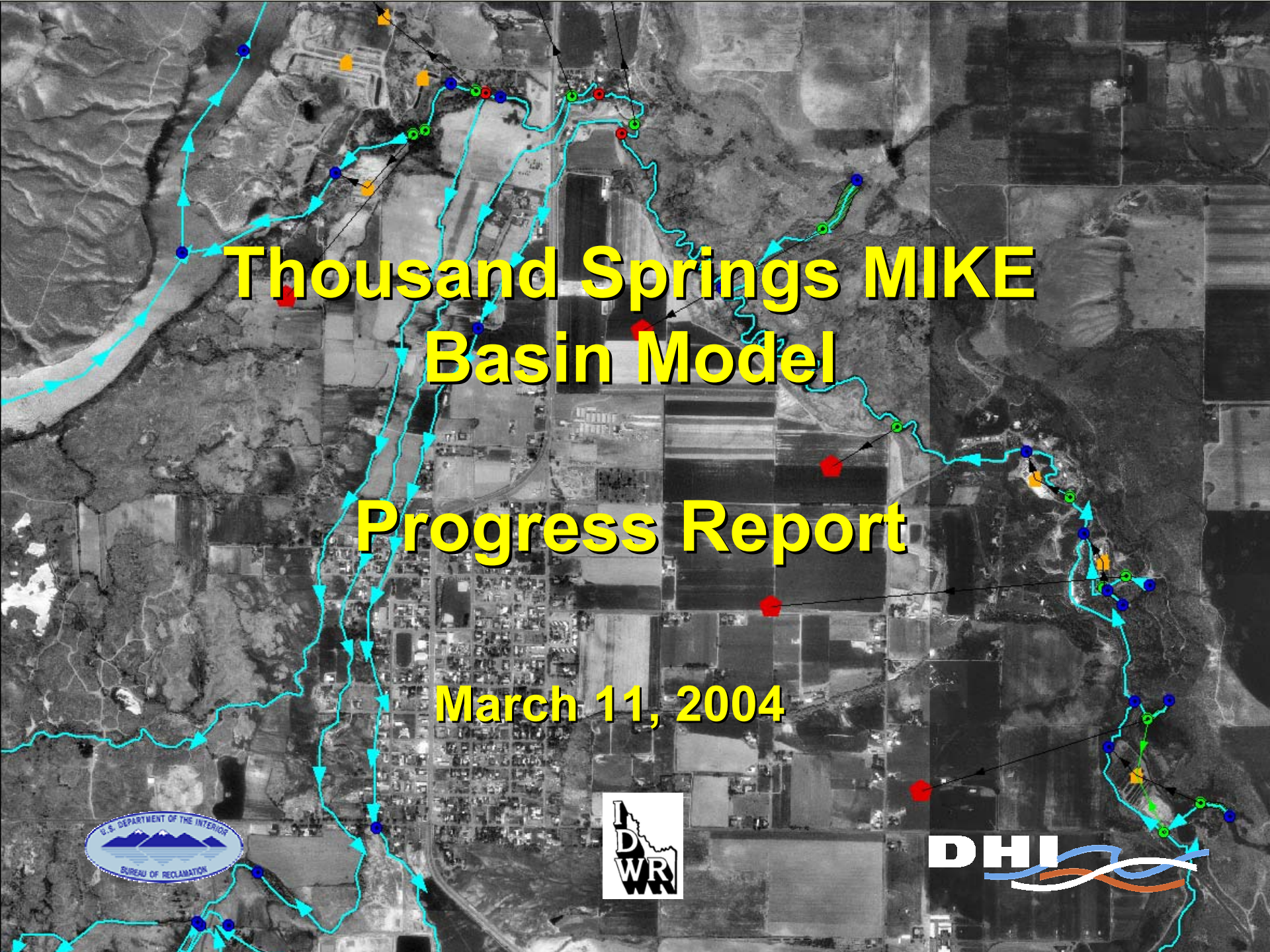
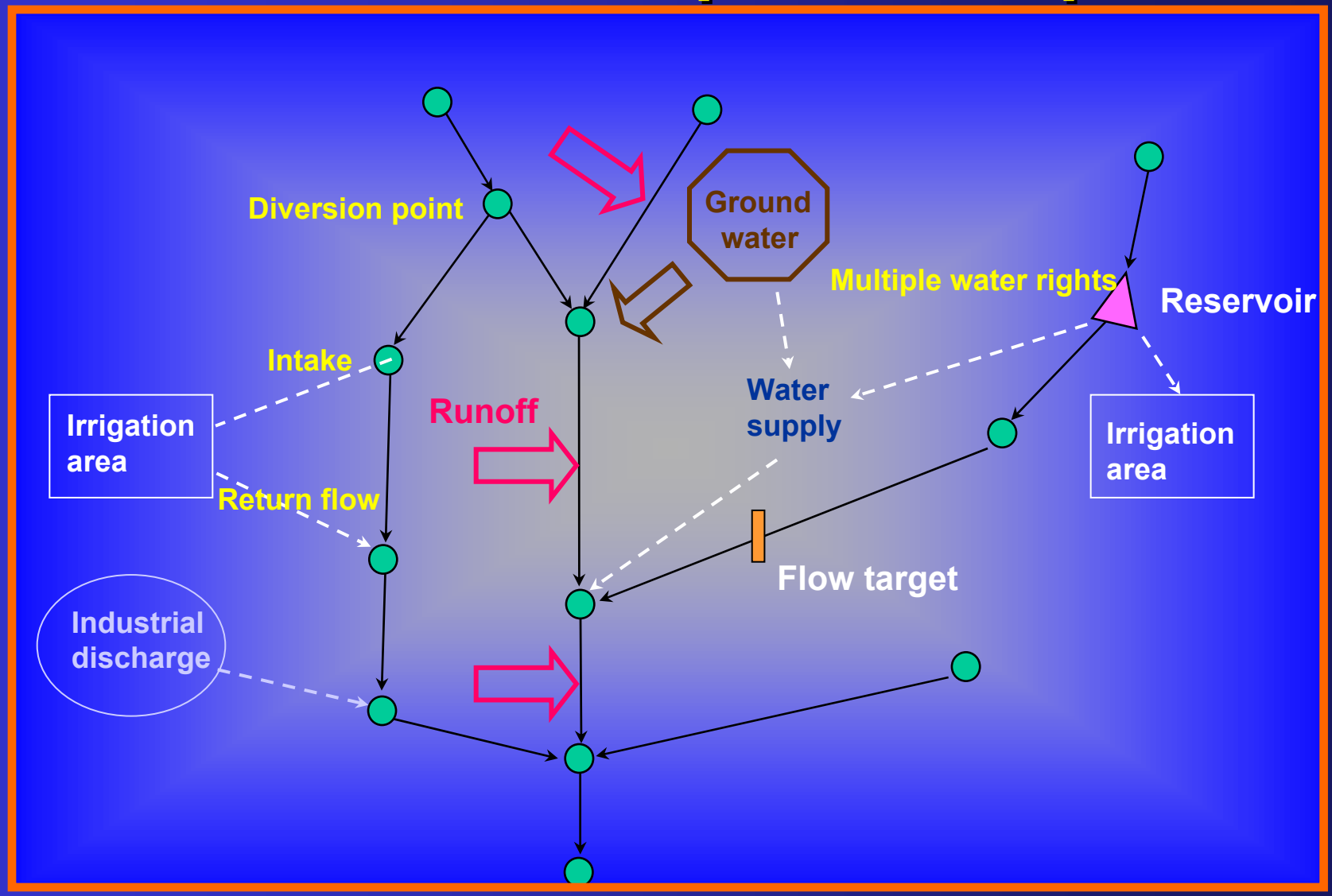
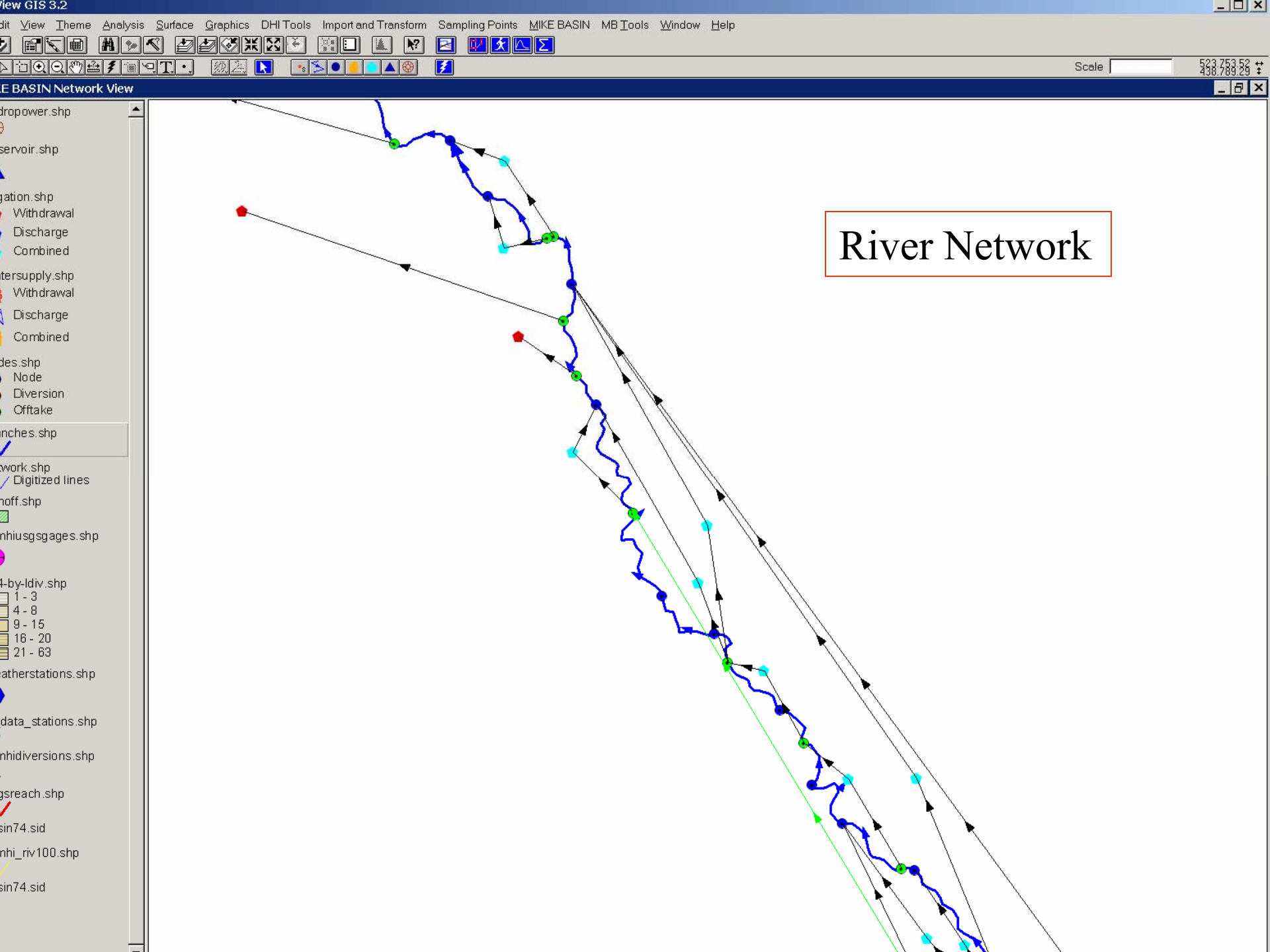

Thousand Springs MIKE
Basin Model
Progress Report
March 11, 2004
U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION
IDWR
DHI

MIKE Basin: A Simple Concept

Overview




View GIS 3.2
Edit View Theme Analysis Surface Graphics DHI Tools Import and Transform Sampling Points MIKE BASIN MB Tools Window Help
Scale
MIKE BASIN Network View
dropower.shp
servoir.shp
gation.shp
Withdrawal
Discharge
Combined
tersupply.shp
Withdrawal
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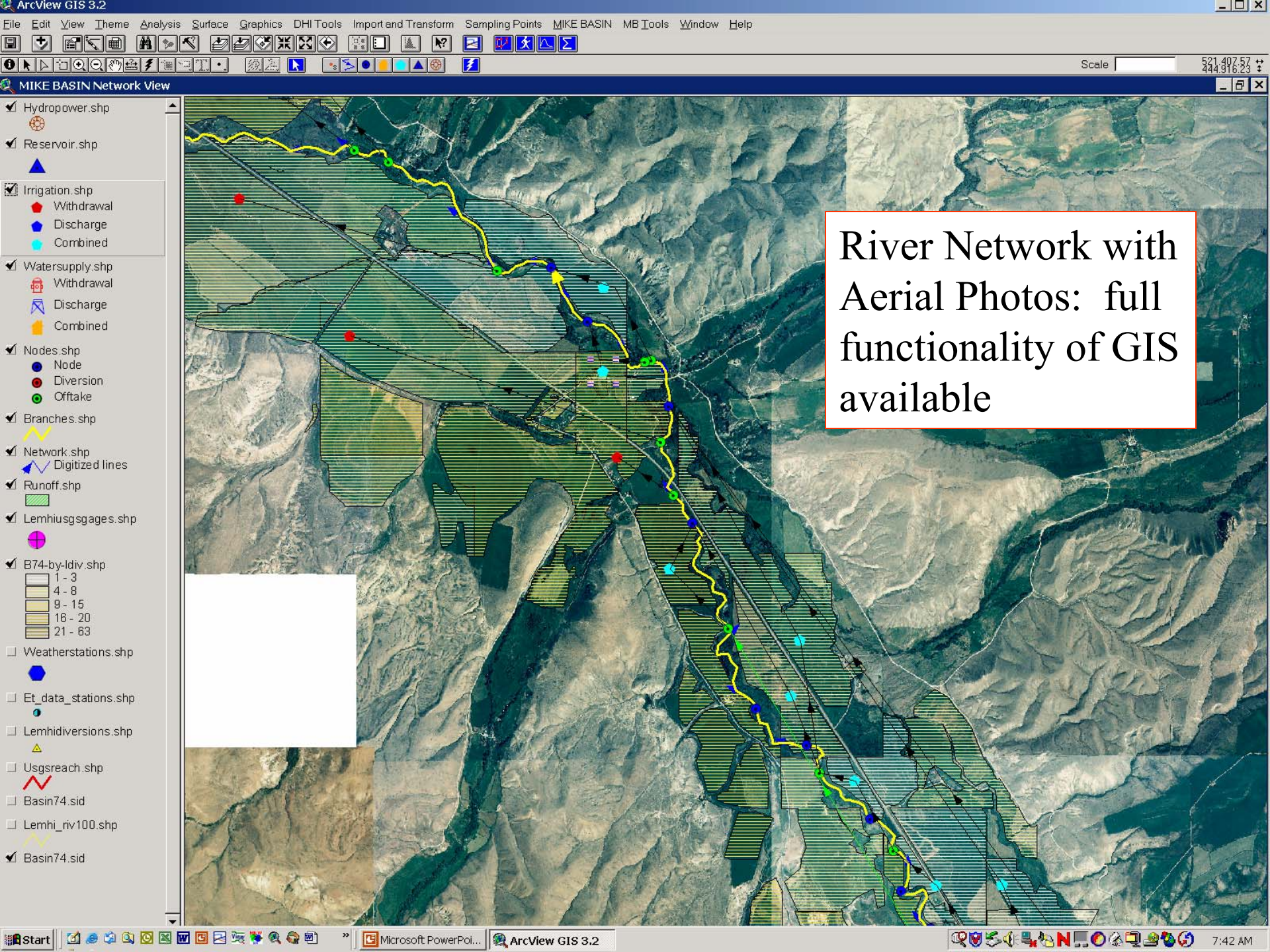
des.shp
Node
Diversion
Offtake
nches.shp
work.shp
Digitized lines
noff.shp
nhiusgsgages.shp
4-by-ldiv.shp
1 - 3
4 - 8
9 - 15
16 - 20
21 - 63
eatherstations.shp
data_stations.shp
nhidiversions.shp
gsreach.shp
sin74.sid
nhi_riv100.shp
sin74.sid
River Network


ArcView GIS 3.2
File Edit View Theme Analysis Surface Graphics DHI Tools Import and Transform Sampling Points MIKE BASIN MB Tools Window Help
Scale
MIKE BASIN Network View
Hydropower.shp
Reservoir.shp
Irrigation.shp
Withdrawal
Discharge
Combined
Watersupply.shp
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Discharge
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Nodes.shp
Node
Diversion
Offtake
Branches.shp
Network.shp
Digitized lines
Runoff.shp
Lemhiusgsgages.shp
B74-by-ldiv.shp
1 - 3
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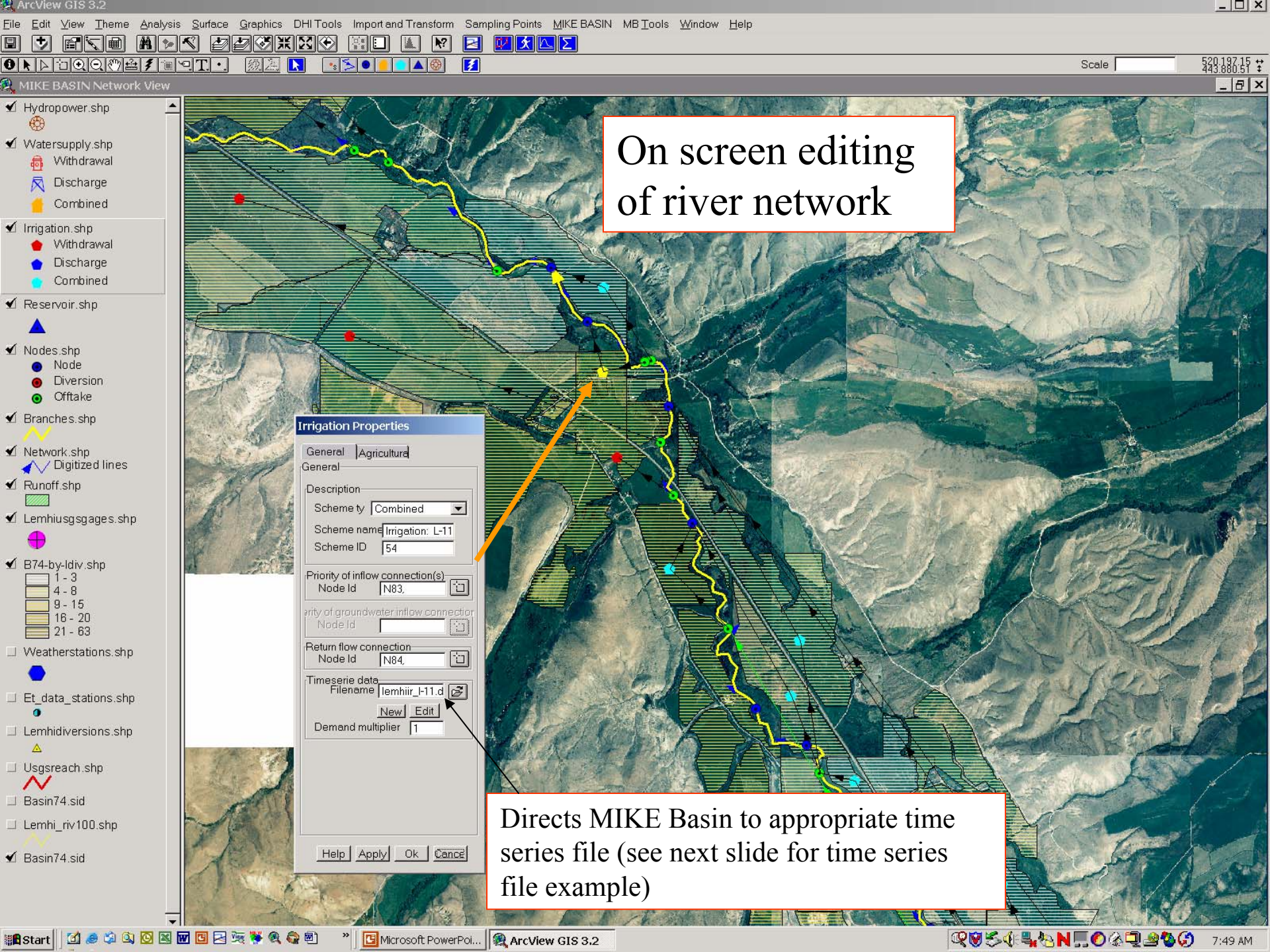
16 - 20
21 - 63
Weatherstations.shp
Et_data_stations.shp
Lemhidiversions.shp
Usgsreach.shp
Basin74.sid
Lemhi_riv100.shp
Basin74.sid
River Network with Aerial Photos: full functionality of GIS available
Start
Microsoft PowerPoi...
ArcView GIS 3.2
7:42 AM


On screen editing of river network
Irrigation Properties
General
Agricultura
General
Description
Scheme ty
Combined
Scheme name
Irrigation: L-11
Scheme ID
54
Priority of inflow connection(s)
Node Id
N83,
Node Id
Return flow connection
Node Id
N84,
Timeserie data
Filename
lemhiir_l-11.d
New
Edit
Demand multiplier
1
Help
Apply
Ok
Cance
Directs MIKE Basin to appropriate time series file (see next slide for time series file example)
MIKE BASIN Network View
Hydropower.shp
Watersupply.shp
Withdrawal
Discharge
Combined
Irrigation.shp
Withdrawal
Discharge
Combined
Reservoir.shp
Nodes.shp
Node
Diversion
Offtake
Branches.shp
Network.shp
Digitized lines
Runoff.shp
Lemhiusgsgages.shp
B74-by-ldiv.shp
1 - 3
4 - 8
9 - 15
16 - 20
21 - 63
Weatherstations.shp
Et_data_stations.shp
Lemhidiversions.shp
Usgsreach.shp
Basin74.sid
Lemhi_riv100.shp
Basin74.sid

Time Series File: Input and output format

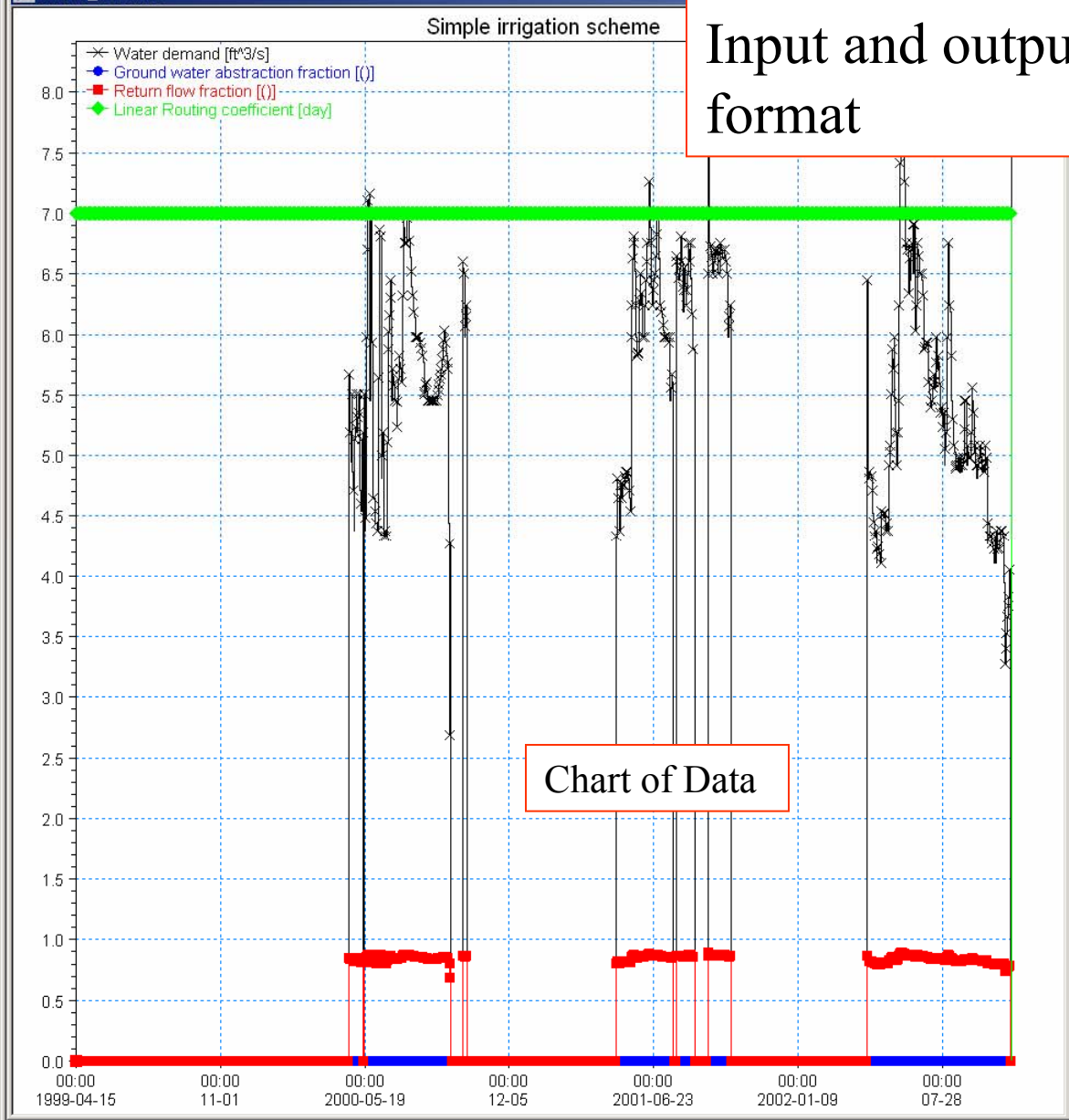
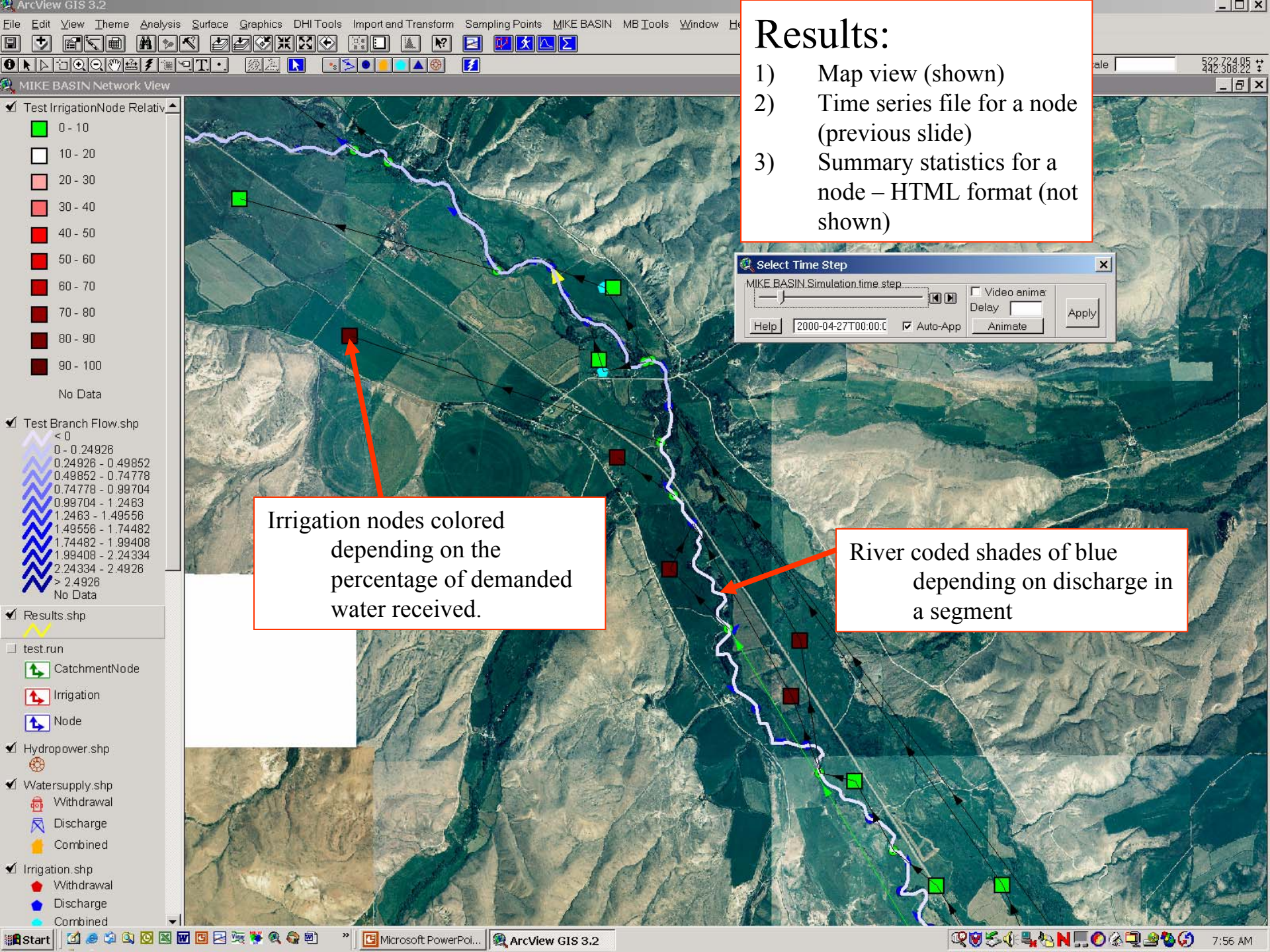


Chart of Data

Tabular Data

	ime	Water deman	Ground water	Return flow fr	Linear Routin
	1999 00:	0	0	0	7
	1999 00:	0	0	0	7
	1999 00:	0	0	0	7
	1999 00:	0	0	0	7
	1999 00:	0	0	0	7
	1999 00:	0	0	0	7
6	4/21/1999 00:	0	0	0	7
7	4/22/1999 00:	0	0	0	7
8	4/23/1999 00:	0	0	0	7
9	4/24/1999 00:	0	0	0	7
10	4/25/1999 00:	0	0	0	7
11	4/26/1999 00:	0	0	0	7
12	4/27/1999 00:	0	0	0	7
13	4/28/1999 00:	0	0	0	7
14	4/29/1999 00:	0	0	0	7
15	4/30/1999 00:	0	0	0	7
16	5/1/1999 00:0	0	0	0	7
17	5/2/1999 00:0	0	0	0	7
18	5/3/1999 00:0	0	0	0	7
19	5/4/1999 00:0	0	0	0	7
20	5/5/1999 00:0	0	0	0	7
21	5/6/1999 00:0	0	0	0	7
22	5/7/1999 00:0	0	0	0	7
23	5/8/1999 00:0	0	0	0	7
24	5/9/1999 00:0	0	0	0	7
25	5/10/1999 00:	0	0	0	7
26	5/11/1999 00:	0	0	0	7
27	5/12/1999 00:	0	0	0	7
28	5/13/1999 00:	0	0	0	7
29	5/14/1999 00:	0	0	0	7
30	5/15/1999 00:	0	0	0	7
31	5/16/1999 00:	0	0	0	7
32	5/17/1999 00:	0	0	0	7
33	5/18/1999 00:	0	0	0	7
34	5/19/1999 00:				7
35	5/20/1999 00:				7
36	5/21/1999 00:				7
37	5/22/1999 00:				7
38	5/23/1999 00:	0	0	0	7
39	5/24/1999 00:	0	0	0	7
40	5/25/1999 00:	0	0	0	7
41	5/26/1999 00:	0	0	0	7
42	5/27/1999 00:	0	0	0	7
43	5/28/1999 00:	0	0	0	7
44	5/29/1999 00:	0	0	0	7
45	5/30/1999 00:	0	0	0	7
46	5/31/1999 00:	0	0	0	7
47	6/1/1999 00:0	0	0	0	7
48	6/2/1999 00:0	0	0	0	7
49	6/3/1999 00:0	0	0	0	7
50	6/4/1999 00:0	0	0	0	7
51	6/5/1999 00:0	0	0	0	7



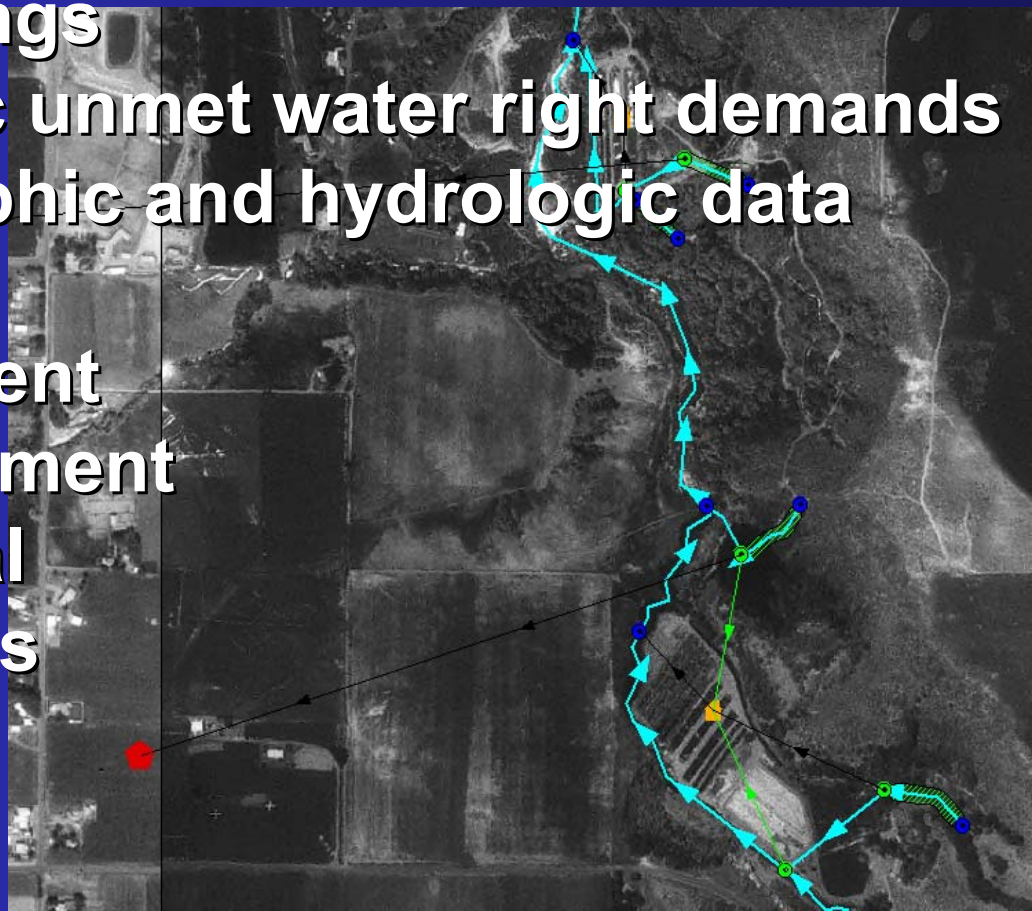
Results:

1) Map view (shown)
2) Time series file for a node (previous slide)
3) Summary statistics for a node – HTML format (not shown)

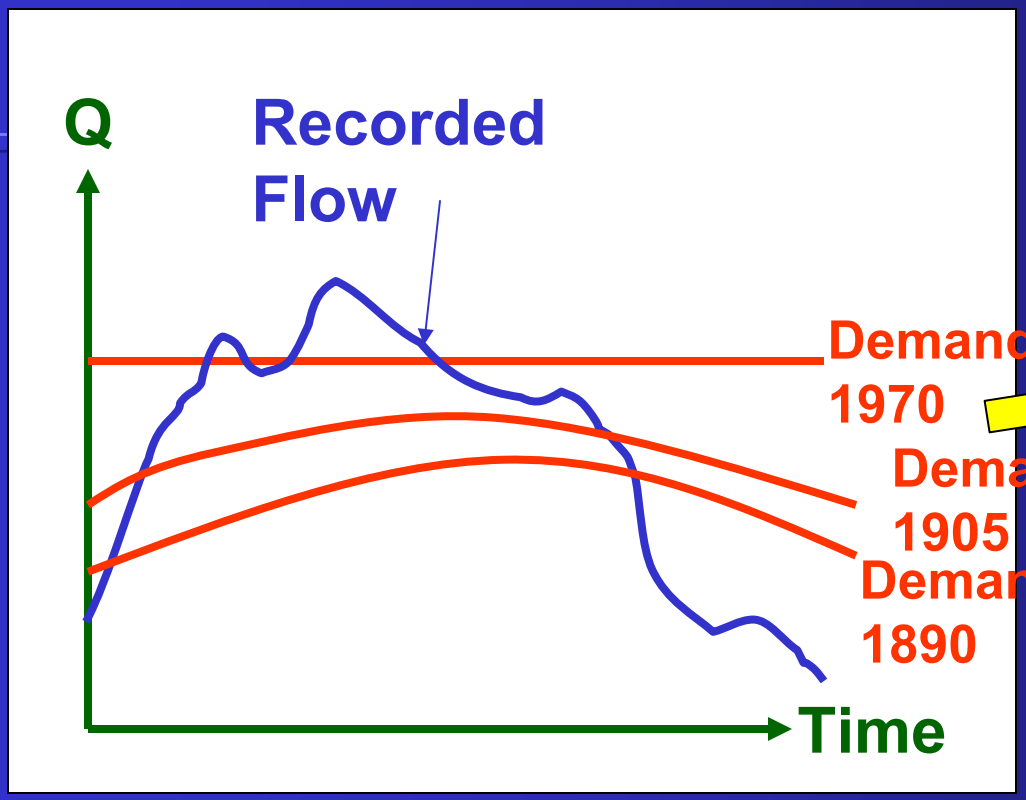
Thousand Springs

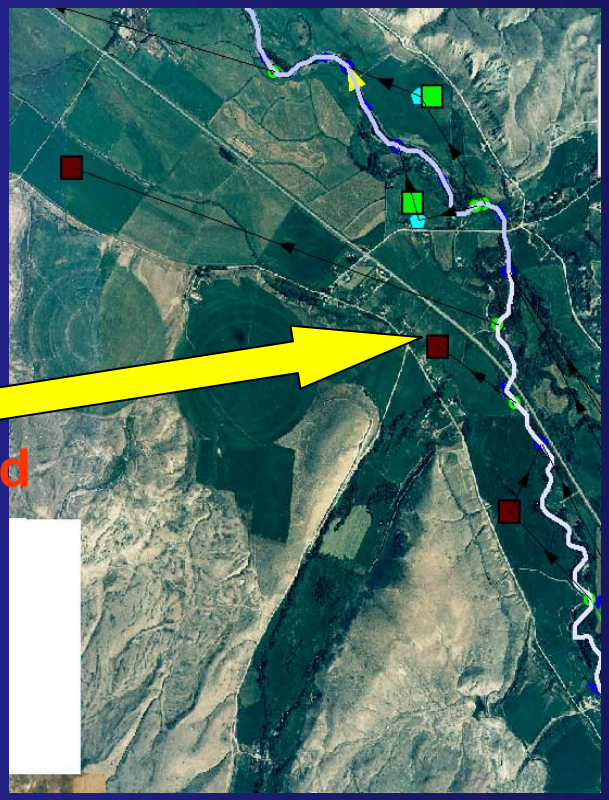
Thousand Springs MIKE Basin Model (TSMBM): Objectives

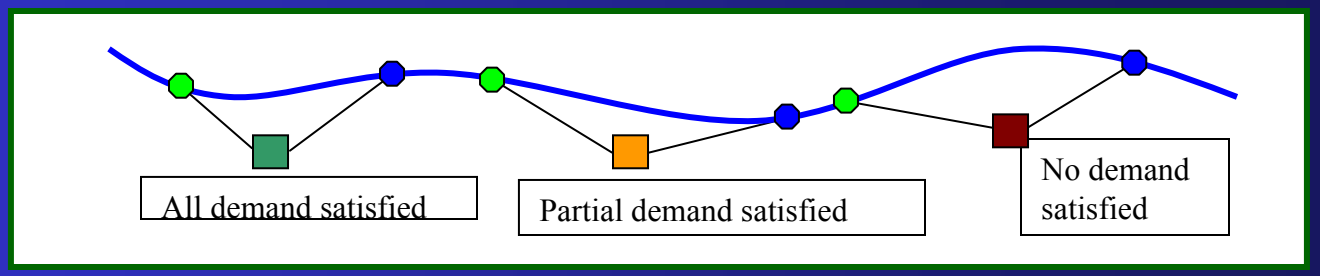
- Understand water movement around Thousands Springs
- Illustrate historic unmet water right demands
- Compile geographic and hydrologic data
  - GIS
  - Water movement
  - Flow measurement
  - Meteorological
- Identify data gaps



TSMBM: Comparing Recorded Water Distribution with Demand







Thousand Springs

TSMBM: Development Activities

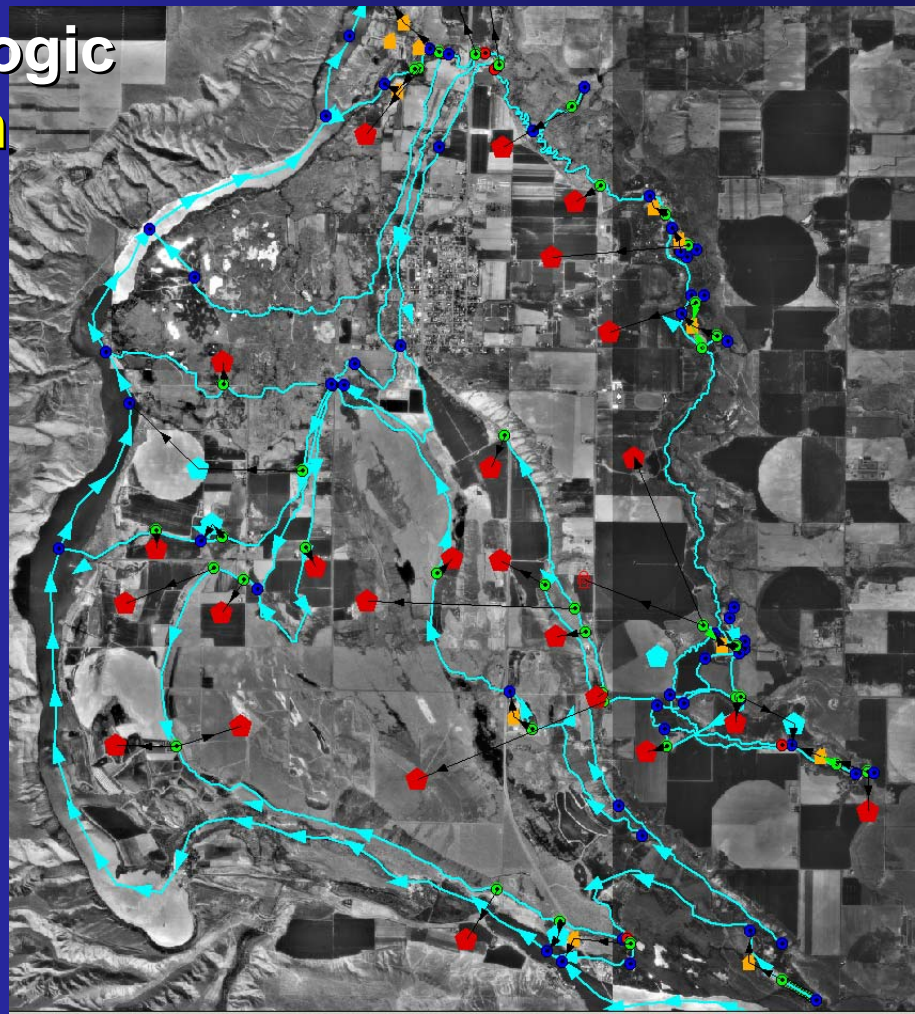
- MIKE Basin Model
- Demands Table
- Comparison Post-Processor
- ArcIMS Website

Thousand Springs

Thousand Springs

TSMBM: Model Procedure

- Model Set Up: Completed
- Accumulation of Hydrologic Data: nearing completion
- Format/Population of Hydrologic Data: nearing completion
- Calibration/Verification:
- Further development: in progress



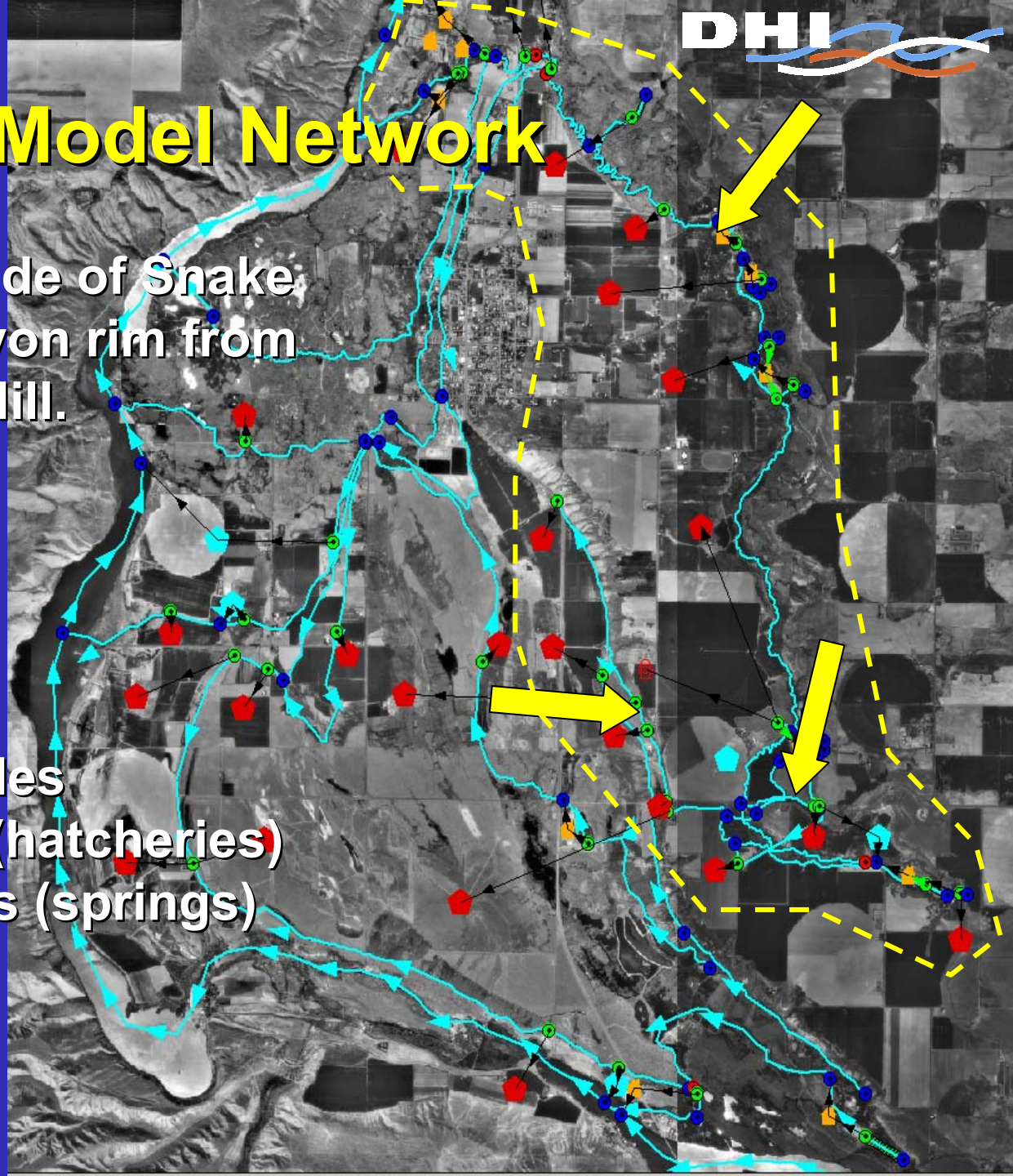
TSMBM: Model Network

Study Area: north side of Snake River below the canyon rim from Blue Lakes to King Hill.

- Billingsley Creek
- Curren Ditch
- Bar S Ditch

Nodes (so far)

- 35 Irrigation nodes
- 21 DCMI nodes (hatcheries)
- 17 Runoff basins (springs)
- 11 Ditches



TSMBM: Populating Model with Data

Microsoft Excel - TS-div-timeseries.xls

File Edit View Insert Format Tools Data Window Help

Arial 10 B I U

D5

TSMBM: Time Series File

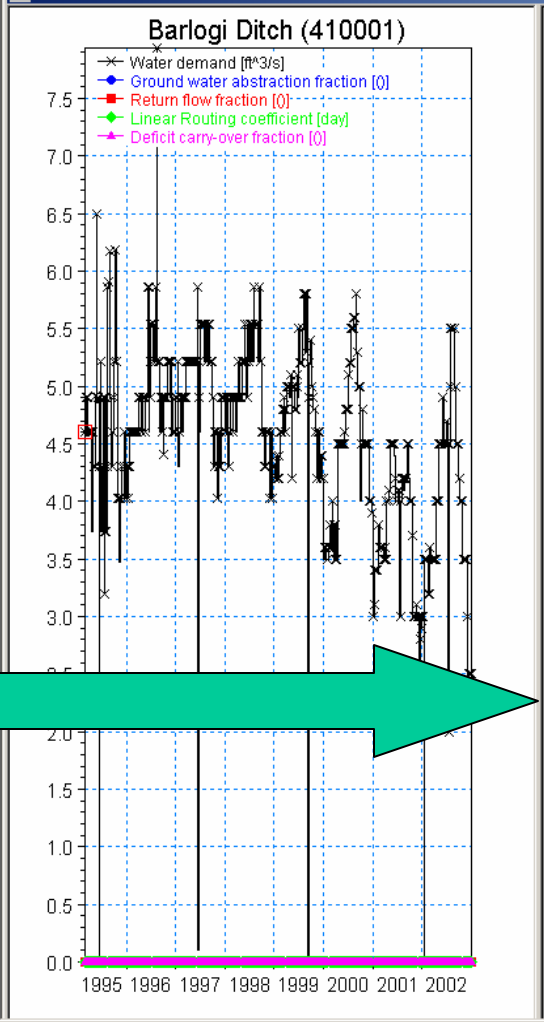
3	Diversion Name	BARLOGI DITCH				
4	Div Type	D			Source	BILLINGSLEY C
5	WD Div No.	410001			Div Comments	MEAS. DEVICE
6	DWR Div No	410001			DHI Type	ag
7	Time Series	Start	3/1/1995		DHI TS File 1	barlogiditch_ag.d
8		End	12/31/2002		DHI TS File 2	

Date	Q (cfs)	GW Fraction ()	Return Fraction ()	Lag Time ()	Deficit Carryover ()
3/1/1995	4.61	0	0	0	0
3/2/1995	4.61	0	0	0	0
3/3/1995	4.61	0	0	0	0
3/4/1995	4.61	0	0	0	0
3/5/1995	4.61	0	0	0	0
3/6/1995	4.91	0	0	0	0
3/7/1995	4.91	0	0	0	0
3/8/1995	4.91	0	0	0	0
3/9/1995	4.91	0	0	0	0
3/10/1995	4.91	0	0	0	0
3/11/1995	4.91	0	0	0	0
3/12/1995	4.91	0	0	0	0
3/13/1995	4.91	0	0	0	0
3/14/1995	4.91	0	0	0	0
3/15/1995	4.91	0	0	0	0
3/16/1995	4.91	0	0	0	0
3/17/1995	4.91	0	0	0	0
3/18/1995	4.91	0	0	0	0
3/19/1995	4.91	0	0	0	0
3/20/1995	4.61	0	0	0	0
3/21/1995	4.61	0	0	0	0
3/22/1995	4.61	0	0	0	0
3/23/1995	4.61	0	0	0	0
3/24/1995	4.61	0	0	0	0
3/25/1995	4.61	0	0	0	0
3/26/1995	4.61	0	0	0	0

TSEdit - barlogiditch_div.dfs0

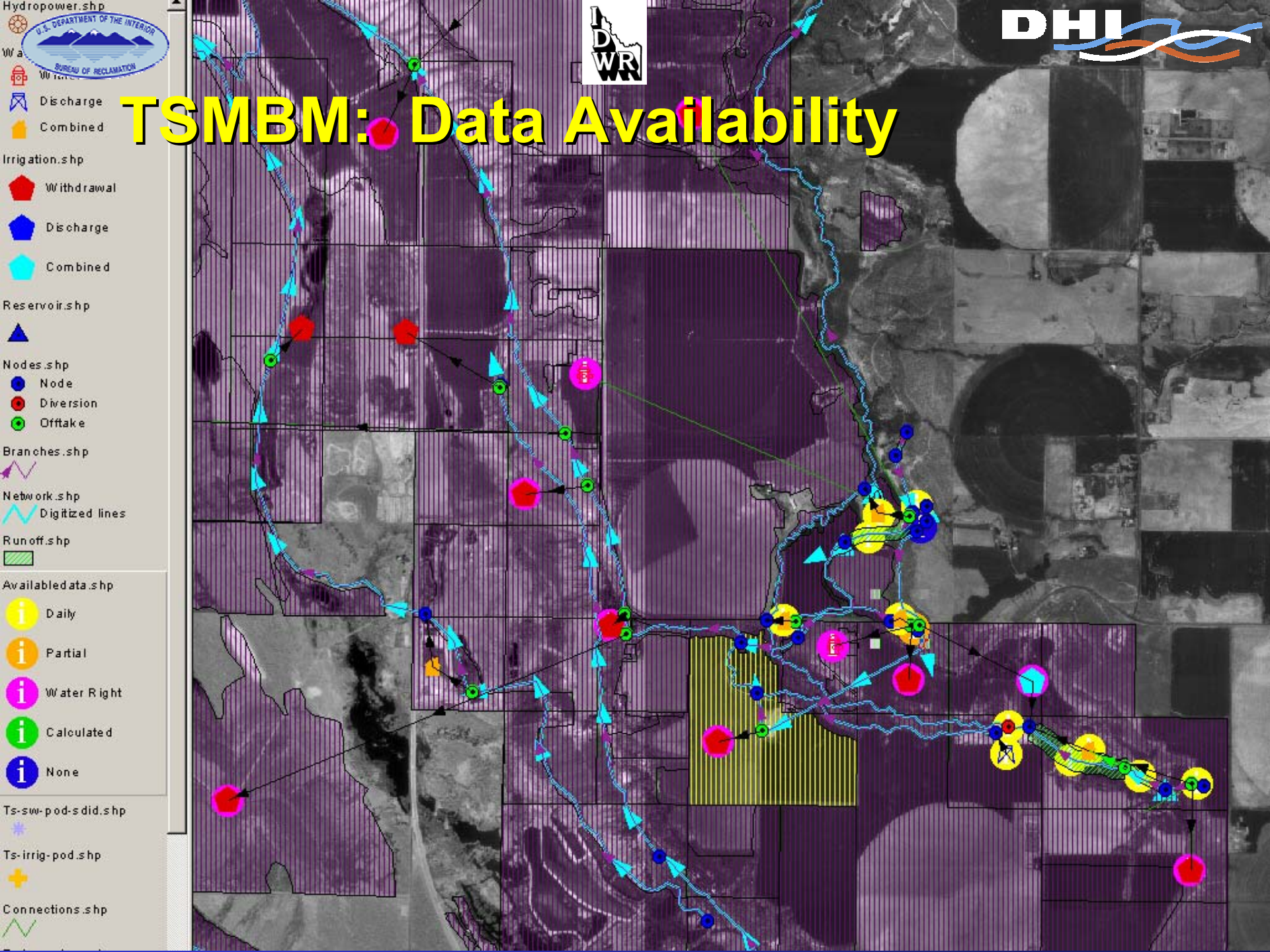
File Edit View Settings Tools Window Help

barlogiditch_div.dfs0



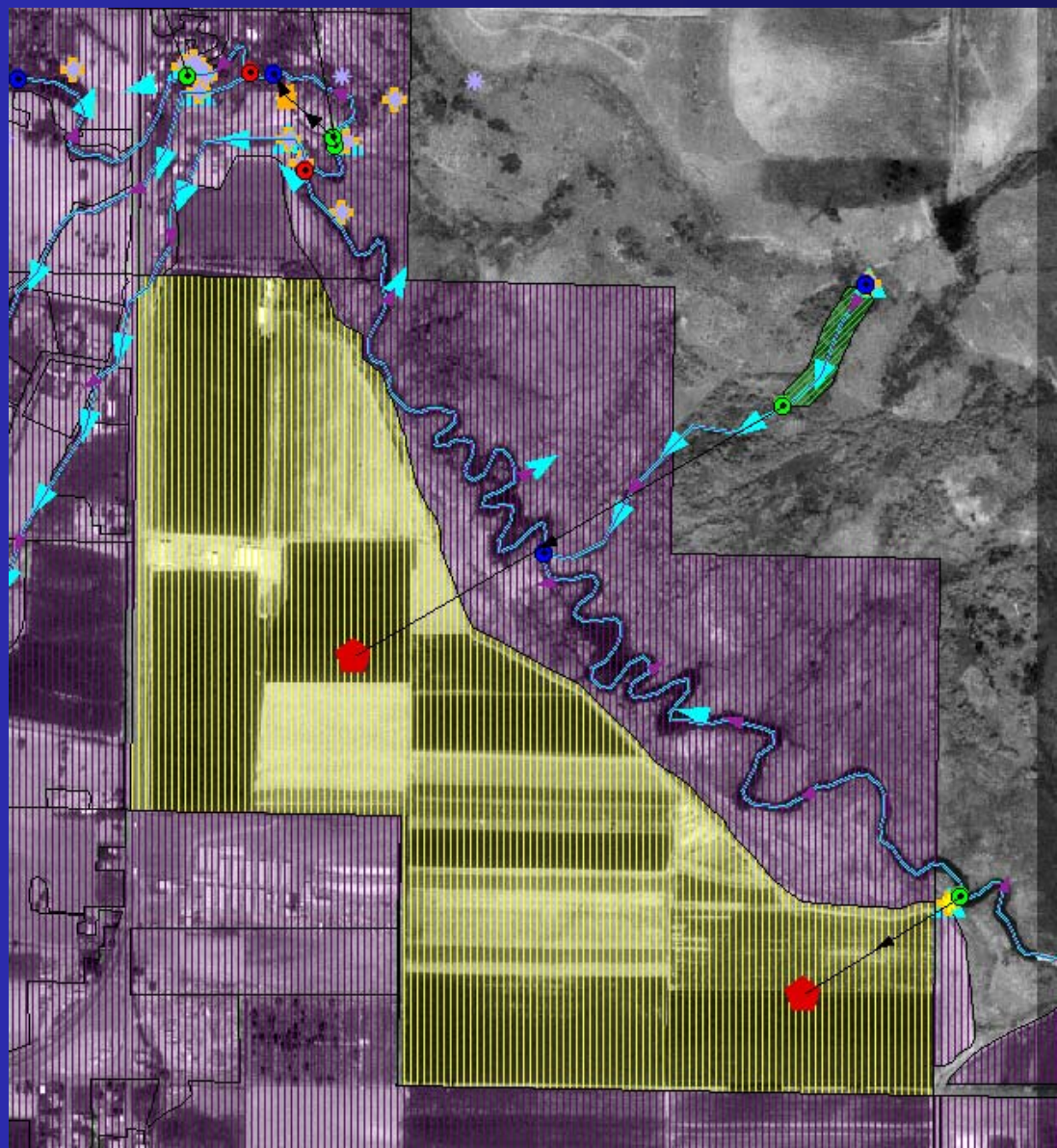
	Time	Water dema	Ground wat	Return flow	Linear Routi
0	3/1/1995 00:	4.61	0	0	0
1	3/2/1995 00:	4.61	0	0	0
2	3/3/1995 00:	4.61	0	0	0
3	3/4/1995 00:	4.61	0	0	0
4	3/5/1995 00:	4.61	0	0	0
5	3/6/1995 00:	4.91	0	0	0
6	3/7/1995 00:	4.91	0	0	0
7	3/8/1995 00:	4.91	0	0	0
8	3/9/1995 00:	4.91	0	0	0
9	3/10/1995 00	4.91	0	0	0
10	3/11/1995 00	4.91	0	0	0
11	3/12/1995 00	4.91	0	0	0
12	3/13/1995 00	4.91	0	0	0
13	3/14/1995 00	4.91	0	0	0
14	3/15/1995 00	4.91	0	0	0
15	3/16/1995 00	4.91	0	0	0
16	3/17/1995 00	4.91	0	0	0
17	3/18/1995 00	4.91	0	0	0
18	3/19/1995 00	4.91	0	0	0
19	3/20/1995 00	4.61	0	0	0
20	3/21/1995 00	4.61	0	0	0
21	3/22/1995 00	4.61	0	0	0
22	3/23/1995 00	4.61	0	0	0
23	3/24/1995 00	4.61	0	0	0
24	3/25/1995 00	4.61	0	0	0
25	3/26/1995 00	4.61	0	0	0
26	3/27/1995 00	4.61	0	0	0
27	3/28/1995 00	4.61	0	0	0
28	3/29/1995 00	4.61	0	0	0
29	3/30/1995 00	4.61	0	0	0
30	3/31/1995 00	4.61	0	0	0
31	4/1/1995 00:	4.61	0	0	0
32	4/2/1995 00:	4.61	0	0	0
33	4/3/1995 00:	4.61	0	0	0
34	4/4/1995 00:	4.61	0	0	0
35	4/5/1995 00:	4.61	0	0	0
36	4/6/1995 00:	4.61	0	0	0
37	4/7/1995 00:	4.61	0	0	0
38	4/8/1995 00:	4.61	0	0	0
39	4/9/1995 00:	4.61	0	0	0
40	4/10/1995 00	4.61	0	0	0
41	4/11/1995 00	4.61	0	0	0
42	4/12/1995 00	4.61	0	0	0
43	4/13/1995 00	4.61	0	0	0
44	4/14/1995 00	4.61	0	0	0
45	4/15/1995 00	4.61	0	0	0

Ready 12/12/2002 2:09:21 PM 4.94812


Hydropower.shp
Discharge
Combined
Irrigation.shp
Withdrawal
Discharge
Combined
Reservoir.shp
Nodes.shp
Node
Diversion
Offtake
Branches.shp
Network.shp
Digitized lines
Runoff.shp
Availabledata.shp
Daily
Partial
Water Right
Calculated
None
Ts-sw-pod-sdid.shp
Ts-irrig-pod.shp
Connections.shp
IDWR
DHI
TSMBM: Data Availability

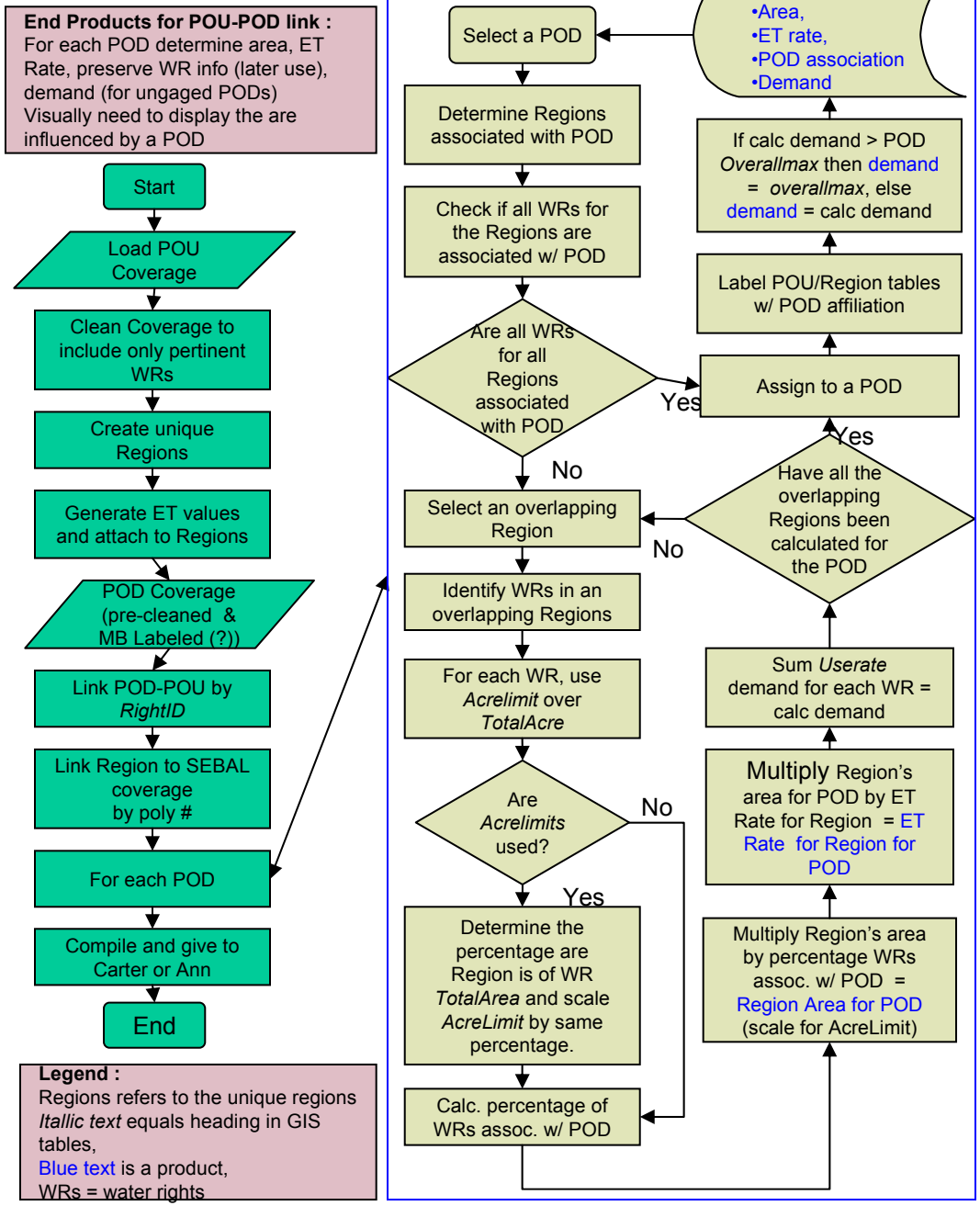
TSMBM: Linking POD-POU

- Calculate WR/ET Rate serviced by a diversion



Thousand Springs

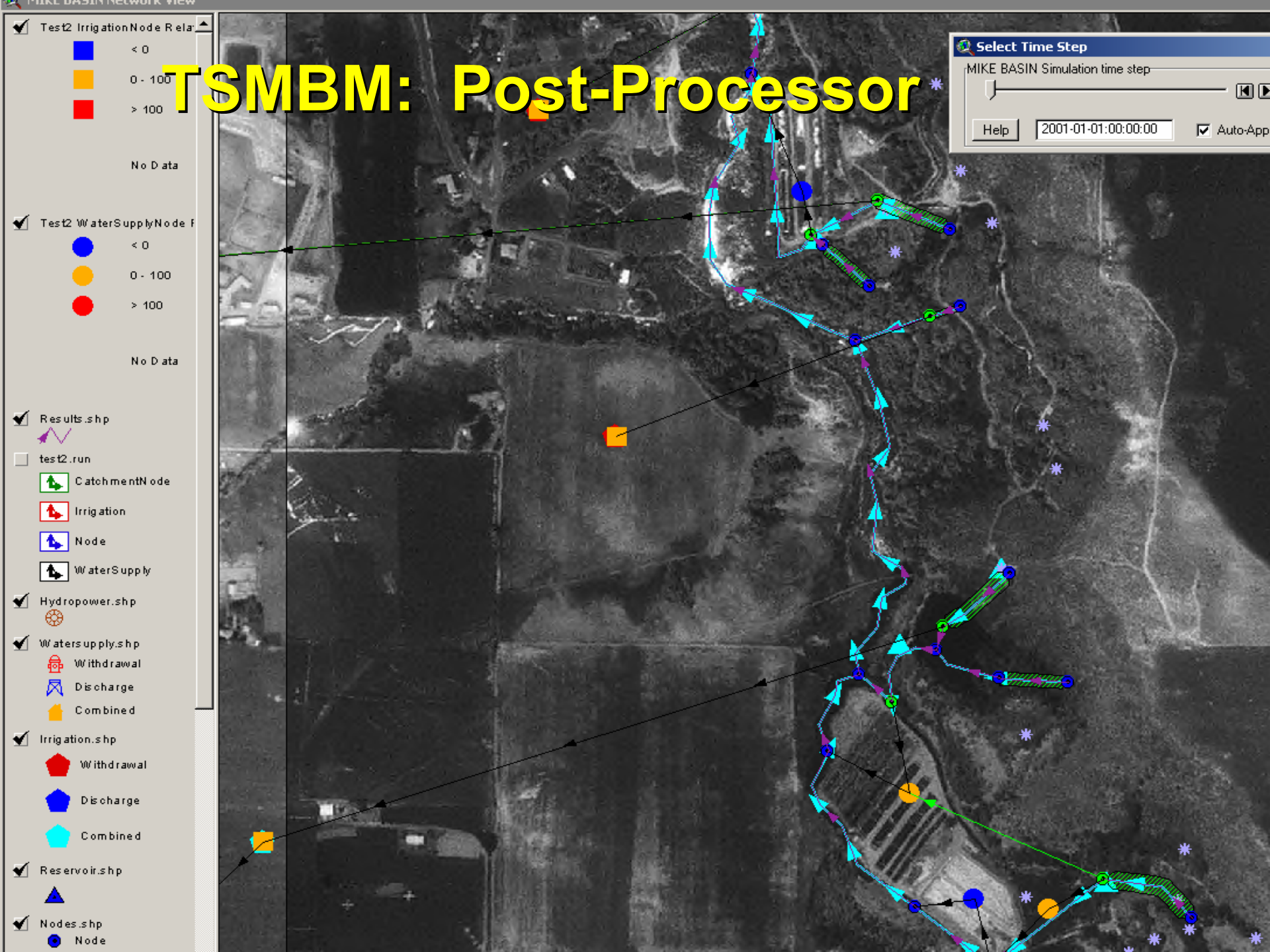
TSMBM: Linking POD-POU



Microsoft Excel - TSMBM_WaterRights.xls

TSMBM: Demand Table

1	**TSMBM: Water Rights**																
2	*Source Information*																
3	POD Name	FISHERIES DEVLMNT/BILLINGSLEY CK.															
4	DHI Node	W2															
5	DHI Type	DCMI		Source	BILLINGSLEY CREEK												
6	WMIS No.	410047		Div Commen	TWO RBC WEIRS MEAS. FLOW TO BOTH HATCHERY & HYDRO												
7	SD ID#	xxxxx		Metal Tag	xxxxx												
8																	
9	*Summary WR Information*																
10	**No.**	**WR #**	**Priority Date**	**WR Quantity**	**Owner**												
11	1	123678	1/7/1970	12.00	Johan Hartnek												
12	2																
13	3																
14	4																
15	5																
16	6																
17	7																
18	8																
19	9																
20	10																
21	11																
22	12																
23	13																
24	14																
25	15																
26	16																
27	17																
28	18																
29	19																
30	20																
41																	
42	*WR Time Series*																
43	WR#	123678	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
44	Priority Date	1/7/1970	1/0/1900	1/0/1900	1/0/1900	1/0/1900	1/0/1900	1/0/1900	1/0/1900	1/0/1900	1/0/1900	1/0/1900	1/0/1900	1/0/1900	1/0/1900	1/0/1900	1/0/190
45	WR Quantity	12.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
46																	
47	**Date**	**Q (cfs)**	**Q (cfs)**	**Q (cfs)**													
48	1/1/2002	12	12	12													
49	1/2/2002	12	12	12													
50	1/3/2002	12	12	12													
51	1/4/2002	12	12	12													
52	1/5/2002	12	12	12													

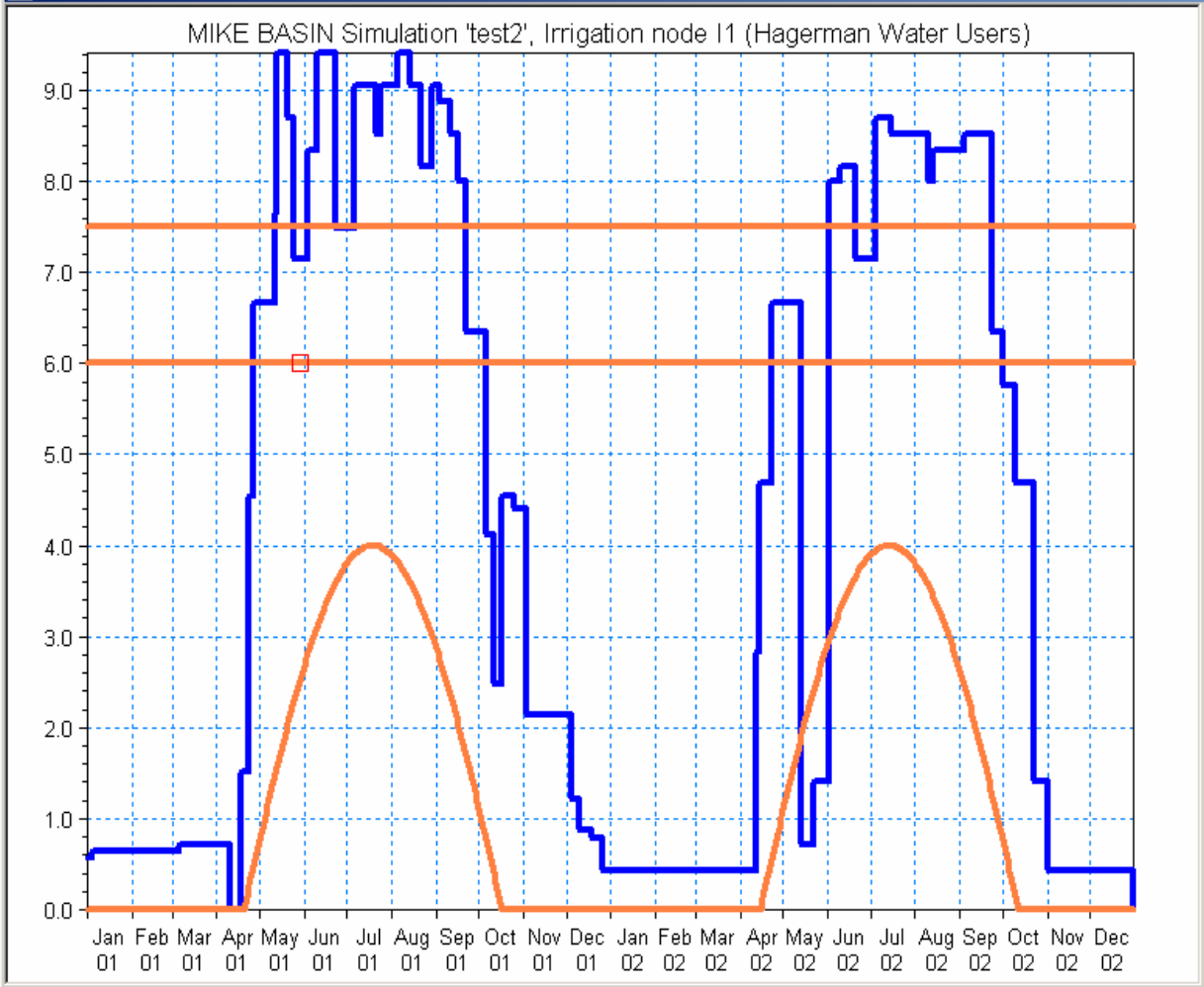

TSMBM: Post-Processor
Test2 IrrigationNode Rela
< 0
0 - 100
> 100
No Data
Test2 WaterSupplyNode F
< 0
0 - 100
> 100
No Data
Results.shp
test2.run
CatchmentNode
Irrigation
Node
WaterSupply
Hydropower.shp
Watersupply.shp
Withdrawal
Discharge
Combined
Irrigation.shp
Withdrawal
Discharge
Combined
Reservoir.shp
Nodes.shp
Node
Select Time Step
MIKE BASIN Simulation time step
Help
2001-01-01:00:00:00
Auto-App

TSMBM: Post-Processor

TSEdit - simpleirrigationnode_i1.dfs0

File Edit View Settings Tools Window Help

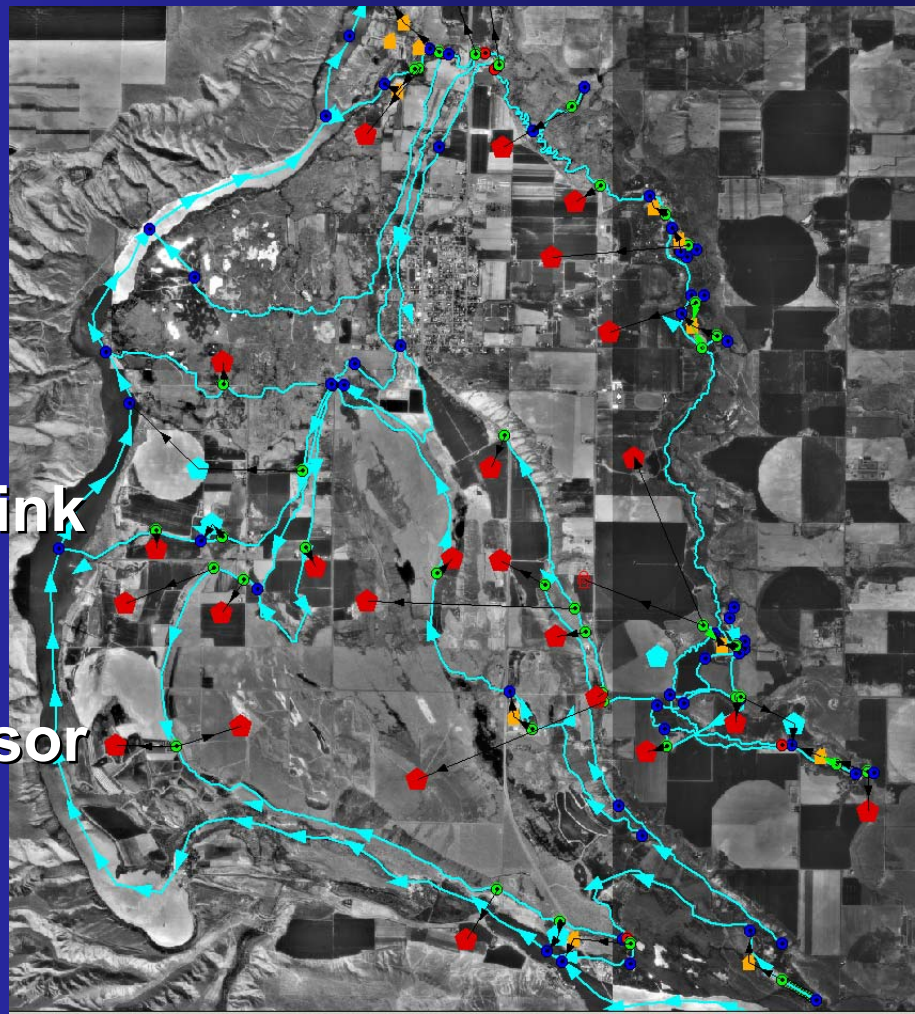
simpleirrigationnode_i1.dfs0 - Modified



	Time	Used water	Demand 191	Demand 194	Demand 1970 [ft^
142	5/23/2001 00	8.69	2.17856	6	7.5
143	5/24/2001 00	8.69	2.23677	6	7.5
144	5/25/2001 00	7.15	2.29431	6	7.5
145	5/26/2001 00	7.15	2.35114	6	7.5
146	5/27/2001 00	7.15	2.40726	6	7.5
147	5/28/2001 00	7.15	2.46265	6	7.5
148	5/29/2001 00	7.15	2.51728	6	7.5
149	5/30/2001 00	7.15	2.57115	6	7.5
150	5/31/2001 00	7.15	2.62424	6	7.5
151	6/1/2001 00:	7.15	2.67652	6	7.5
152	6/2/2001 00:	7.15	2.72799	6	7.5
153	6/3/2001 00:	7.15	2.77863	6	7.5
154	6/4/2001 00:	8.34	2.82843	6	7.5
155	6/5/2001 00:	8.34	2.87736	6	7.5
156	6/6/2001 00:	8.34	2.92541	6	7.5
157	6/7/2001 00:	8.34	2.97258	6	7.5
158	6/8/2001 00:	8.34	3.01884	6	7.5
159	6/9/2001 00:	8.34	3.06418	6	7.5
160	6/10/2001 00	9.41	3.10858	6	7.5
161	6/11/2001 00	9.41	3.15204	6	7.5
162	6/12/2001 00	9.41	3.19454	6	7.5
163	6/13/2001 00	9.41	3.23607	6	7.5
164	6/14/2001 00	9.41	3.27661	6	7.5
165	6/15/2001 00	9.41	3.31615	6	7.5
166	6/16/2001 00	9.41	3.35468	6	7.5
167	6/17/2001 00	9.41	3.39219	6	7.5
168	6/18/2001 00	9.41	3.42867	6	7.5
169	6/19/2001 00	9.41	3.4641	6	7.5
170	6/20/2001 00	9.41	3.49848	6	7.5
171	6/21/2001 00	9.41	3.53179	6	7.5
172	6/22/2001 00	9.41	3.56403	6	7.5
173	6/23/2001 00	7.49	3.59518	6	7.5
174	6/24/2001 00	7.49	3.62523	6	7.5
175	6/25/2001 00	7.49	3.65418	6	7.5
176	6/26/2001 00	7.49	3.68202	6	7.5
177	6/27/2001 00	7.49	3.70874	6	7.5

TSMBM: Challenges/Limitations

- Lack of diversion data: most apparent in "intra-ditch" diversions
- POD-POU-WMIS links for demands table
- Unscrambling conflicts between POU-POD-WMIS link and plumbing
- Comparison post-processor development with eye on future



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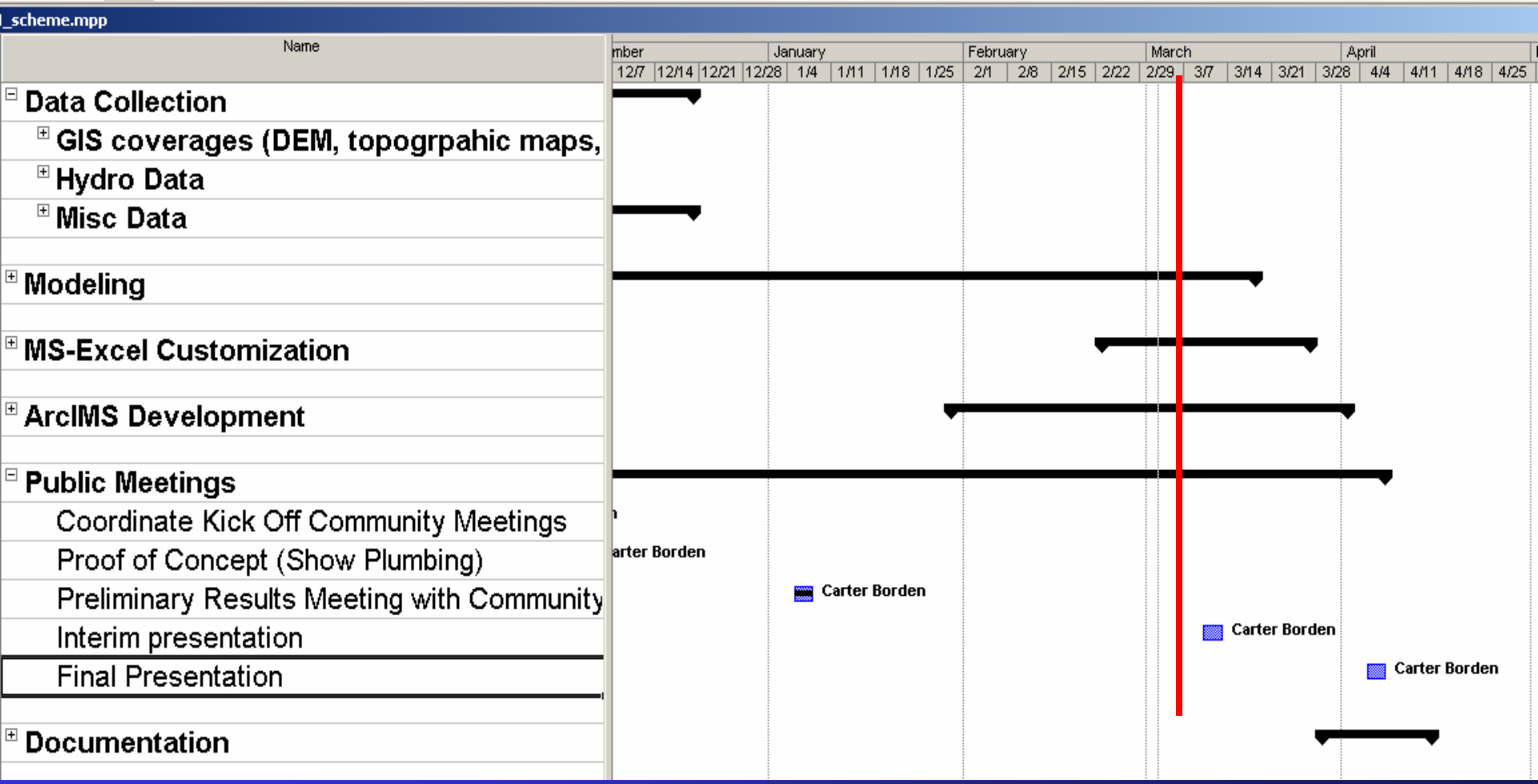
TSMBM: Schedule



TSMBM: To Do

Remaining in the project

- Finish model network and data population
- Calibration
- Evaluate historic allocation vs. demand
- ArcIMS development

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TSMBM: Future Development

Beyond the project

- Extend the model to entire study area
- Distribute water according to water right demands for “what-if” scenarios
- Migrate model to ArcGIS MIKE Basin
- Eventually link to groundwater model

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TSMBM: Conclusion

- An integrated depiction of water availability, movement, and use that can be viewed directly on GIS maps
- A surface water model to examine unmet WR demands
- Compilation of hydrologic data from numerous sources in one convenient place, posted to web
- Identification of data deficiencies to more efficiently guide expenditures for future data collection efforts

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